

CLAIMS

What is claimed is:

1. A kickdown mechanism (12) for use with a pedal arm (16) to provide a kickdown feel to an operator of the pedal arm (16), said mechanism comprising;
 - 5 a housing (24) defining a chamber (30),
 - a resilient member (37) presenting a bearing surface (40) movable within said chamber (30) along an operational axis (A),
 - 10 a detent member (54) in contact with said bearing surface (40) and movable between an initial position and a plurality of active positions against a biasing force of said resilient member (37) while maintaining contact with said bearing surface (40) whereby a force required to move said detent member (54) from said initial position to said plurality of active positions provides the kickdown feel to the operator, and
 - 15 an actuator (66) engaging said detent member (54) for moving said detent member (54) from said initial position to said plurality of active positions when engaged by the pedal arm (16),
 - 20 said assembly characterized by said bearing surface (40) being disposed at an acute angle (α_1) to said operational axis (A) to urge said detent member (54) back to said initial position under the bias of said resilient member (37) when the pedal arm (16) is disengaged from said actuator (66).
 2. A mechanism as set forth in claim 1 wherein said acute angle (α_1) is between thirty and sixty degrees.
 3. A mechanism as set forth in claim 2 wherein said acute angle (α_1) is forty-five degrees.
 4. A mechanism as set forth in claim 1 wherein said resilient member (37) presents a second bearing surface (42) positioned at a second acute angle (α_2) to said operational axis (A).

30

5. A mechanism as set forth in claim 4 including a second detent member (56) in contact with said second bearing surface (42) and movable between an initial position and a plurality of active positions against the bias of said resilient member (37) while maintaining contact with said second bearing surface (42).

5

6. A mechanism as set forth in claim 5 wherein said detent members (54, 56) and said bearing surfaces (40, 42) mirror one another relative to said operational axis (A).

10 7. A mechanism as set forth in claim 6 wherein said housing (24) includes a sidewall (32) and said sidewall (32) defines first (58) and second (60) pairs of detent pockets for receiving said detent members (54, 56).

15 8. A mechanism as set forth in claim 7 wherein said first (40) and second (42) bearing surfaces define a wedge between said detent members (54, 56) for urging said detent members (54, 56) into said detent pockets (58, 60) under the bias of said resilient member (37).

20 9. A mechanism as set forth in claim 8 further including a plurality of shoulders (64) formed in said chamber (30) to further define said detent pockets (58, 60) and urge said detent members (54, 56) out from said detent pockets (58, 60) when said detent members (54, 56) are moved by said actuator (66) wherein each of said detent members (54, 56) move radially and axially along said bearing surfaces (40, 42) toward said operational axis (A) as said detent members (54, 56) move out from said detent pockets (58, 60).

25 10. A mechanism as set forth in claim 9 wherein said detent pockets (58, 60) and said shoulders (64) are disposed in upper and lower portions of said chamber (30) to provide a balance of forces acting upon said kickdown mechanism (12) relative to said operational axis (A).

11. A mechanism as set forth in claim 10 wherein said resilient member (37) is further defined as a plunger (38) biased by a spring (44) between said housing (24) and said plunger (38).

5 12. A mechanism as set forth in claim 11 wherein said actuator (66) includes a front end and a projection (70) protruding from said front end for engaging the pedal arm (16).

10 13. A mechanism as set forth in claim 12 wherein said housing (24) includes a sidewall (32) and a first pair of elongated slots (34) defined therein and said actuator (66) includes a first pair of guide members (74) for reciprocating within said first pair of slots (34).

15 14. A mechanism as set forth in claim 13 wherein said sidewall (32) defines a second pair of elongated slots (36) and said actuator (66) includes a second pair of guide members (76) for reciprocating within said second pair of elongated slots (36) wherein said second pair of elongated slots (36) are enclosed by said sidewall (32) and said second pair of guide members (76) include detent tabs (78) for engaging said second pair of elongated slots (76) to retain said actuator (66) in said housing (24).

20

15. A mechanism as set forth in claim 14 wherein said detent members (54, 56) are further defined as rollers (54, 56).

25 16. A mechanism as set forth in claim 15 wherein said rollers (54, 56) are formed from metal and said housing (24), plunger (38), and actuator (66) are formed from plastic.

17. A pedal assembly (10), comprising;
a pedal housing (14),
a pedal arm (16) pivotally supported by said pedal housing (14),
a kickdown housing (24) defining a chamber (30) near said pedal arm (16), a
5 plurality of detent pockets (60, 62) in said chamber (30), and an operational axis (A)
through said chamber (30),
a plunger (38) slidable within said chamber (30) along said operational axis (A),
a spring (44) disposed between said kickdown housing (24) and said plunger
(38) for biasing said plunger (38) axially along said operational axis (A),
10 a pair of detent members (54, 56) seated within said detent pockets (58, 60) and
moveable out from said detent pockets (58, 60) against the bias of said plunger (38)
whereby a force required to move said detent members (54, 56) out from said detent
pockets (58, 60) provides a kickdown feel to an operator, and
an actuator (66) for moving said detent members (54, 56) out from said detent
15 pockets (58, 60) when engaged by said pedal arm (16),
said assembly characterized by said plunger (38) defining a wedge between said
detent members (54, 56) for urging said detent members (54, 56) back into said detent
pockets (58, 60) under the bias of said plunger (38) when said pedal arm (16) is
disengaged from said actuator (66).
20
18. A mechanism as set forth in claim 17 further including an electrical
generator (22) supported by said pedal housing (14) for generating a control signal that
varies in magnitude in proportion to the extent of movement of said pedal arm (16)
relative to said pedal housing (14).
- 25
19. A mechanism as set forth in claim 18 further including an adjustment
device (18) for adjusting a position of said kickdown mechanism (12) relative to said
pedal arm (16) to synchronize movement of said detent members (54, 56) out from said
detent pockets (58, 60) with generation of the control signal at a predetermined
30 magnitude.